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ABSTRACT

The electronic storybook may be one tool that can simulate the read aloud story by a human reader. If the electronic story can serve to provide some of the elements derived from a human book reading experience, then time spent with these electronic stories can give children some building blocks that will aid in their literacy acquisition. A study aimed to discover if children's responses to stories delivered by a computer are similar to children's responses to stories read by a human reader. The study employed a 2(mode) x 2(story) x 2(time) ANOVA with 2 between subjects factors (mode and story) and 1 within subjects factor (time). Some research questions were addressed qualitatively. Participants were 40 six year olds from a rural school having a large percentage of students receiving free or reduced lunches. Out of the 32 comparisons, there were only 3 significant mode effects ($p < .05$) with the CD story experience being statistically significantly better than the human read experience in two of the three comparisons. All other comparisons showed no significant difference between the two modes. The CD story experience was essentially equivalent to the human read experience with regard to the literacy learnings tested by the chosen assessment instruments. In examining effect sizes, however, a trend favoring the human read experience was seen. Qualitative data showed few differences. It did show, however, that although boys responded more often to questions after having experienced the CD story experience than girls, they preferred the human story experience. (Contains six tables of data, a figure, and 16 references.) (Author/NKA)

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ED 418 380

EMERGENT READERS' RESPONSES TO READ ALOUD STORIES AND STORIES PRESENTED BY A COMPUTER

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Abstract

Story book reading to children has long been considered to be a predictor of later success in reading. Since reading to children is such an important event, it would be efficacious for teachers to spend as much time with this activity as possible. But teacher time is and always has been a precious and scarce commodity. The electronic storybook may be one tool that can simulate the read aloud story by a human reader. If the electronic story can serve to provide some of the elements derived from a human book reading experience, then time spent with these electronic stories can give children some building blocks that will aid in their acquisition of literacy. This inquiry was an attempt to discover if children's responses to stories delivered by a computer are similar to children's responses to stories read by a human reader.

The study employed a 2(mode) x 2 (story) x 2 (time) ANOVA with two between subjects factors (mode and story) and one within subjects factor (time). Some research questions were addressed qualitatively. Participants were 40 six year olds, 20 boys and 20 girls, from a rural school having a large percentage of students receiving free or reduced lunches.

Out of the 32 comparisons, there were only three significant mode effects ($p < .05$) with the CD story experience being statistically significantly better than the human read experience in two of the three comparisons. All other comparisons showed no significant difference between the two

modes. The CD story experience was essentially equivalent to the human read experience with regard to the literacy learnings tested by the chosen assessment instruments.

In examining effect sizes however, a trend favoring the human read experience was seen. There were 13 moderate to large effect sizes for the 32 comparisons. The human read experience was favored in 10 of the 13 comparisons while the CD story experience was favored in only three comparisons. Had the sample size been larger, these comparisons showing moderate to large effect sizes may have been statistically significant.

Qualitative data showed few differences. One interesting finding derived from the qualitative data was that although boys responded more often to questions after having experienced the CD story experience than girls, they preferred the human story experience.

EMERGENT READERS' RESPONSES TO READ ALOUD STORIES
AND STORIES PRESENTED BY A COMPUTER

Storybook reading to children has long been considered to be a predictor of later success in reading. Since reading to children is such an important event, it would be efficacious for teachers to spend as much time with this activity as possible. But teacher time is a precious and scarce commodity. The electronic storybook may be one tool that can simulate the read aloud story. If the electronic story can serve to provide some of the elements derived from a traditional book reading experience, then time spent with these electronic stories can give children some building blocks that will aid in their acquisition of literacy. This inquiry was an attempt to discover if children respond to read aloud stories delivered by a computer in ways similar to their responses to stories read to them in the traditional manner.

From research and intuition, many adults have come to know that the act of reading to a child or children generates all sorts of positive responses and literacy learnings (Bush, 1990; PTA, 1987; Scarborough & Dobrich, 1994; Teale, 1984). Teale found, in a review of selected research on the topic of reading to children, that even the literature from the turn of the century encourages and praises the act of reading aloud to children (Teale, 1984). In a review done by Scarborough and Dobrich in 1994, it was found there has been and still is widespread agreement within the academic community that reading aloud to children is a highly beneficial practice that

promotes the acquisition of literacy-related knowledge and, consequently, later success in reading achievement (Scarborough & Dobrich, 1994). Virtually unquestioned by researchers is the premise that reading to children contributes directly to their early literacy development. Children who are frequent recipients of read aloud stories often display literacy skills, and uses of language and information structures (Olson & Gee, 1988; Teale, 1984), mental scaffolding around which to process and understand new stories (Olson & Gee, 1988). When questioning adults about their school experiences, many report that their most cherished memories of elementary school are of teachers reading aloud to the them (Slaughter, 1994) either individually or in a group setting. In a theoretical paper by Kimmel and Segel it was suggested that of paramount importance in reading to children is the physical and emotional closeness, the adult attentiveness (Kimmel & Segel, 1983). It has been called, in many reviews, the single most important literacy event that children can experience (Anderson, Hiebert, Scott, & Wilkerson, 1985). Indeed, children with a background of book experiences have developed a preparedness for successful literacy acquisition. Holdaway (1979) calls this preparedness a "literacy set".

Research Questions

The specific research questions to be addressed quantitatively were as follows:

1. Is there a relation between the mode of story presentation (computer vs. human reader) and emergent readers' recall of story elements?

2. Is there a relation between the mode of story presentation (computer vs. human reader) and emergent readers' story drawings?
3. Is there a relation between the mode of story presentation (computer vs. human reader) and emergent readers' verbal reporting of idea units consistent with the story using the drawing recall as a prompt?
4. Is there a relation between the mode of story presentation (computer vs. human reader) and emergent readers' story retellings, as measured by items recalled?
5. After being exposed to both types of story deliveries, do students show a preference to mode of story delivery as measured by a Story Preference tool?
6. Is students' gender related to their preferences?
7. Will responses to questions concerning engagement with literature show any differences?
8. Will students' drawings, as analyzed using the constant-comparative method of analysis, show any differences?

Design

The study employed a true experimental design in that the students were randomly assigned to the four groups. A 2 (mode) x 2 (story) x 2 (time) ANOVA with two between subjects factors (mode and story) and one within subjects factor (time) was applied. The 2 modes of story delivery were human read and computer presentation. The 2 stories used were *Little Monster at School* by Mercer Mayer and *Berenstain Bears Get in a Fight* by Jan and Stan Berenstain. Both stories are available in "Living Books" (developed by Random House and Broderbund Company). The 2 time frames involved were immediate and delayed assessments.

Instruments

The story elements measures consisted of 10 multiple choice items. The instrument was given using story pictures that depicted different structural elements of the stories.

For the Drawing Recall/BME (Beginning, Middle, End), each child was given a large piece of construction paper that had been folded into three equal sections. At the top of each section of the paper the words *Beginning, Middle, End* were printed. Children were asked to represent these story elements with their drawings.

The drawing recall/Idea Units consisted of the research assistant asking the child to tell about his or her drawing--the same drawing that the child had completed for the BME measure. The researcher labeled and wrote explanations of the drawing as the child told about his or her work. The number of idea units consistent with the story were each tallied. Drawings were also wholistically evaluated.

The story retelling procedure was a checklist consisting of elements of story structure. Students retellings were audio taped, transcribed, and recorded onto the checklist.

For the story preference tool, students were shown the front covers of *Little Monster at School* and *The Berenstain Bears Get in a Fight*. Students were asked to choose their favorite story.

The Engagement questionnaire queried students as to their involvement with the stories in terms of their preferences and personal experiences. Five questions were asked of each student, only 2 questions yielded enough data for comparisons.

Quantitative Analysis

Although every effort was made to choose stories that were very similar in terms of content, interest level, readability level and format, it was impossible to ascertain whether or not the stories were indeed equivalent until all data were collected. Initial

examination of data showed an apparent lack of equivalence of the stories, thus, the analysis was conducted in two phases. Table 1 shows the phases of analysis. Parallel statistical analyses were

Table 1
Phases of Analysis

Phase 1 (1st Story Experience)				Phase 2 (2nd Story Experience)	
Group	N	Story	Mode	Story	Mode
1	10	LM	HU	BB	CD
2	10	LM	CD	BB	HU
3	10	BB	HU	LM	CD
4	10	BB	CD	LM	HU

Note: LM=Little Monster, BB=Berenstain Bears, HU= human read, CD=CD ROM

conducted for each phase. Prior to examining the main effect for mode in each comparison, it was necessary to examine the questions focusing on the interactions between mode and story, and mode and time.

Story Elements/Phase 1 Descriptively, the means ranged from 47 (*Bears*, CD, delayed) to 62 (*Bears*, human, immediate). The distributions were generally normally distributed. The human read experience was almost equivalent to the CD experience upon immediate testing for *Little Monster* (Means for Human and CD modes were 55 and 56, respectively). Means for the human read experience were greater than means for the CD experience in three out of four comparisons. Means for this and all other Phase 1 measures are found in Table 2. No statistically significant mode x story ($E(1,36)=0.05$, $p>.05$) or mode x time interactions ($E(1,36)=0.01$, $p>.05$) were found. Given that these and other possible interactions (e.g., time x story x mode) were not significant, it was possible to examine the main effect for mode. Results revealed no significant

mode effect ($F(1,36)=1.64, p > .05$). Analysis of variance for this and all other phase 1 measures are found in Table 3.

Drawing Recall/BME/Phase 1 Descriptively, the means ranged from 50.10 (*Monster*, Human, delayed) to 83.40 (*Bears*, CD immediate). The distributions were generally normally distributed. The human read experience was almost equivalent to the CD experience upon immediate testing for *Little Monster* (Means for Human and CD modes were 80.20 and 76.80, respectively). Means for the CD experience were greater than means for the human read experience in three out of four comparisons for this measure. No statistically significant mode x story ($F(1,36)=0.03, p > .05$) or mode x time interactions ($F(1,36)=2.28, p > .05$) were found. There was a significant interaction of time x story x mode ($F(1,36) = 3.53, p = .05$). A post hoc analysis using the Tukey procedure was performed. For each story, means were compared between mode of story delivery at both immediate and delayed time frames. Results of this procedure showed that for *Little Monster*, children who received the story in the CD mode scored significantly higher ($p < .05$) on the drawing measure ($M=76.90$) compared to children who received the story from a human reader ($M=50.10$).

Drawing Recall/Idea Units/Phase 1 Descriptively, the means ranged from 2.90 (*Monster*, human, delayed) to 8.89 (*Bears*, CD, immediate). The distributions were generally normally distributed. Means for the CD experience were greater than means for the human read experience across stories and times. No statistically significant mode x story ($F(1,36)=1.94, p > .05$) or mode x time interactions ($F(1,36)=0.02, p > .05$) were found. Since these and other

possible interactions were not significant, the main effect for mode was examined. Results showed a significant mode effect ($F(1,36)=3.03, p<.10$) with children receiving the story via the computer recalling significantly more idea units than the children receiving the story from a human being. In examining the main effect for story, results also showed a significant story effect ($F(1,36)=7.77, p <.05$) with *Bears* scoring significantly higher than *Monsters*.

Story Retelling/Phase 1 Descriptively, the means ranged from 3.75 (*Bear*, CD, delayed) to 7.97 (*Monster*, human, delayed). The distributions were generally normally distributed. Means for the human read experience were greater than means for the CD experience in three out of four comparisons. No statistically significant mode x story ($F(1,36)=0.79, p>.05$) or mode x time interactions ($F(1,36)=2.05, p>.05$) were found. Since these and other possible interactions were not significant, the main effect for mode was examined. Results showed no significant mode effect ($F(1,36)=1.44, p>.05$).

Table 2
Means for Phase 1

Story Elements								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	55.00	21.21	56.00	17.13	60.00	17.64	53.00	21.63
BB	62.00	20.44	47.00	21.11	59.00	23.31	51.00	11.01
Drawing Recall/BME								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	80.20	31.88	76.80	35.20	50.10	47.78	76.90	31.31
BB	73.50	34.32	83.40	32.36	73.60	26.03	80.20	27.83
Drawing Recall/Idea Units								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	4.60	2.27	7.90	7.60	2.90	2.99	5.90	2.77
BB	8.40	2.88	8.89	4.87	7.50	1.65	7.80	3.01
Story Retelling								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	6.74	3.77	7.27	3.86	7.97	3.00	6.83	3.96
BB	5.83	2.85	4.39	2.31	6.40	4.85	3.75	2.20

Note: LM=Little Monster, BB=Berenstain Bears

Table 3
Analysis of Variance for Phase 1

F					
Source	df	Story Elements	BME	Idea Units	Story Retelling
Between subjects					
Story (S)	1	0.05	0.47	7.77**	4.61**
Mode (M)	1	1.64	1.05	3.03*	1.44
S x M	1	0.56	0.03	1.94	0.79
<u>S</u> within - group error	36	(641.53)	(1901.60)	(20.19)	(18.78)
Within subjects					
Time (T)	1	0.09	3.45	3.67	0.13
T x S	1	0.01	2.28	0.38	0.19
T x M	1	0.01	2.28	0.02	2.05
T x S x M	1	2.32	3.53*	0.00	0.05
T x <u>S</u> within- group error	36	(120.97)	(397.17)	(10.68)	(4.95)

**p<.05, *p<.10

Story Elements Measure/Phase 2. Scores for this measure in Phase 2 ranged from 20% to 90%. Descriptively, the means ranged from 46.00 (*Monsters*, CD, delayed) to 61.00 (*Monster*, human, immediate and *Bears*, CD, immediate). The distributions were generally normally distributed. For *Berenstain Bears* the CD and human immediate experience produced means that were almost equivalent (CD=61, human=59). The *Berenstain Bears* delayed experience produced means that were indeed equivalent (CD=57, human=57). For *Little Monster*, means for the human read experience at both immediate and delayed time points were greater than means generated by the CD experience. Means for this measure and all other Phase 2 measures are found in Table 4. No statistically significant mode x story ($F(1,36)=1.41$, $p>.05$) or mode

x time interactions ($F(1,36)=0.08, p>.05$) were found. Since these and other possible interactions were not significant, the main effect for mode was examined. Results showed no significant mode effect ($F(1,36)=0.99, p>.05$). Analysis of variance for this and all other phase 2 measures are found in Table 5.

Drawing Recall/BME/Phase 2 Phase 2 scores for this comparison ranged from 0 to 100%. Graphs for this instrument by story can be seen in Figure 6. Descriptively, the means ranged from 53.60 (*Bears*, CD, immediate) to 90.10 (*Bears*, human, immediate). The distributions were generally normally distributed. In three of the four comparisons means for the human read experience were greater than means for the CD experience. No statistically significant mode x story ($F(1,36)=1.94, p>.05$) or mode x time interactions ($F(1,36)=0.01, p>.05$) were found. There was a statistically significant time x story x mode interaction ($F(1,36)=6.43, p < .05$). A post hoc analysis using the Tukey procedure was performed. For each story, means were compared between mode of story delivery at both immediate and delayed time frames. Results of this procedure showed that in *Berenstain Bears*, children in the human read condition scored significantly ($p<.05$) higher ($M=90.10, SD=15.94$) compared to children in the computer condition ($M=53.60, SD=39.04$).

Drawing Recall/Idea Units/Phase 2 Scores for Phase 2 Idea Units ranged from 0 to 27. Descriptively, the means ranged from 4.50 (*Bears*, CD, delayed) to 12.30 (*Monster*, human, immediate). The distributions were generally normally distributed. Means for the human read experience were greater than means for the CD

experience in three out of four comparisons. No statistically significant mode x story ($E(1,36)=0.24, p>.05$) or mode x time interactions ($E(1,36)=2.36, p>.05$) were found. Since these and other possible interactions were not significant, the main effect for mode was examined. Results showed no significant mode effect ($E(1,36)=0.95, p>.05$). Results did show a significant effect for story ($E(1,36)=16.95, p<.01$)

Story Retelling/Phase 2 Scores for this measure in Phase 2 ranged from 0 to 14. Descriptively, the means ranged from 4.05 (*Bear*, CD, delayed) to 9.15 (*Monster*, human, immediate). The distributions were generally normally distributed. The means for the human read experience in all comparisons were greater than the means for the CD experience. No statistically significant mode x story ($E(1,36)=1.32, p>.05$) or mode x time interactions ($E(1,36)=0.00, p>.05$) were found. Since these and other possible interactions were not significant, the main effect for mode was examined. Results showed no significant mode effect ($E(1,36)=2.90, p>.05$). Results did show a significant effect for story ($E(1,36)=17.91, p<.01$) with *Monsters* scoring significantly higher than *Bears*..

Since the sample size was so small, effect sizes were computed for each dependent variable for the various conditions defined by Phase (1 and 2), Story (*Monsters* and *Bears*), and Time (immediate, delayed). Altogether, 32 effect sizes were computed.

Table 4

Means for Phase 2

Story Elements								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	61.00	20.79	50.00	16.33	58.00	18.74	46.00	21.71
BB	59.00	20.25	61.00	17.29	57.00	17.67	57.00	14.94
Drawing Recall/BME								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	80.10	32.16	73.50	34.32	86.70	32.18	70.20	33.05
BB	90.10	15.94	53.60	39.04	70.20	36.53	80.20	27.83
Drawing Recall/Idea Units								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	12.30	7.06	9.60	3.41	9.10	4.23	10.70	4.92
BB	7.20	3.91	5.41	3.34	6.00	3.56	4.50	2.07
Story Retelling								
	Immediate				Delayed			
	Human		C D		Human		C D	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
LM	9.15	2.79	6.81	3.85	9.64	2.91	7.08	3.75
BB	5.12	2.29	4.57	2.84	4.44	1.84	4.05	2.72

Note: LM=Little Monster, BB=Berenstain Bears

Table 5

Analysis of Variance for Phase 2

F					
Source	df	Story Elements	BME	Idea Units	Story Retelling
Between Subjects					
Story (S)	1	0.81	0.23	16.95***	17.91***
Mode (M)	1	0.99	2.14	.95	2.90
S x M	1	1.41	0.01	.24	1.32
<u>S</u> within - group error	36	(554.58)	(1438.80)	(25.51)	(13.91)
Within subjects					
Time (T)	1	1.54	0.20	1.97	0.07
T x S	1	0.01	0.02	0.00	1.36
T x M	1	0.08	2.71	2.36	0.00
T x S x M	1	0.01	6.43**	1.78	0.05
T x <u>S</u> within- group error	36	(136.81)	(617.91)	(11.21)	(3.31)

***p<.01, **p<.05, *p<.10

Using Cohen's (1960) guidelines, values around 0.20 were considered small, 0.50 were viewed as moderate, and 0.80 and larger were considered large. Nineteen effect sizes were found to be in favor of the human read experience. Of those effect sizes, five were large, seven were moderate, and seven were small. Thirteen effect sizes were in favor of the computer experience. Of those effect sizes, ten were small, two were moderate and one was large. Table 6 summarizes moderate and large effect sizes. Of the 13 comparisons listed in Table 6, three are in favor of the computer experience while 10 favor the human read experience.

Table 6

Moderate and Large Effect Sizes for Comparisons Between Human
Read and Computer Condition

Variable	Story	Time	Phase	Effect
Story Elements	Bears	Immediate	1	0.72
	Monster	Immediate	2	0.59
	Monster	Delayed	2	0.59
BME	Monster	Delayed	1	-0.66
	Bears	Immediate	2	1.22
	Monster	Delayed	2	0.51
Idea Units	Monster	Delayed	1	-1.04
	Monster	Immediate	1	-0.59
	Bears	Delayed	2	0.52
Story Retelling	Bears	Delayed	1	0.70
	Bears	Immediate	1	0.56
	Monster	Immediate	2	0.70
	Monster	Delayed	2	0.76

Note. Moderate effects >0.50, Large effects >0.80. Negative effect sizes favor computer experience, positive effect sizes favor human read experience.

Story Preference Analysis

In terms of their choice of book, 55% of the students chose *Little Monster at School* and 45% of the students chose *The Berenstain Bears Get in a Fight*. Of the students who chose "Little Monster," 11 were boys and 11 were girls. Of the students who chose "Bears," 9 were boys and 9 were girls. Clearly, neither book showed any difference in terms of story preference or gender.

In examining the next layer of data, however, one can see some differences. From the total number of students, 30% chose the story that was presented to them via CD ROM. Of this 30%, 67% were girls and 33% were boys.

Twenty-eight students (70%) chose the book presentation. Of these students, 57% were boys and 43% were girls. Collapsing these

percentages, 10% of the boys preferred the CD ROM story, 20% of the girls preferred the CD ROM story, 40% of the boys preferred the book presentation, and 30% of the girls preferred the book presentation. As seen in Figure 1, even though there was no clear preference in terms of the actual story, there was a clear preference in terms of the mode of delivery. With the book--the human read mode, 70% of the children agreed by their choices that they preferred this mode of story delivery.

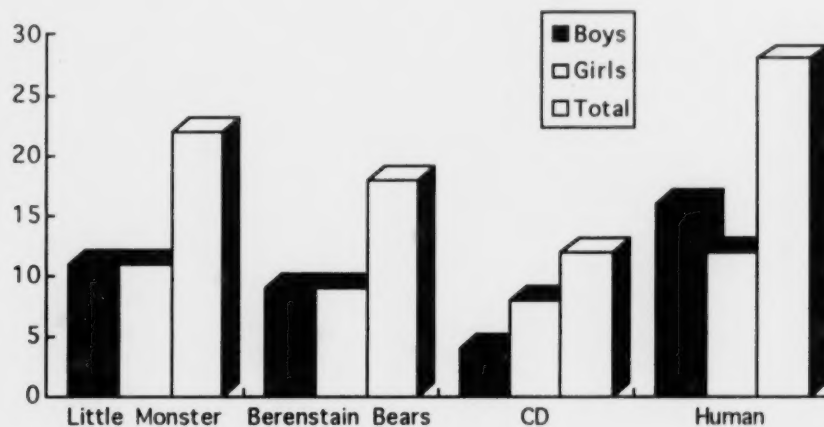


Figure 1 Story preference
Qualitative Analysis

Overall, the Engagement Questionnaire showed that boys responded slightly more often than did girls in the CD version of each story. In *Little Monster*, boys and girls responded equally in the human read mode of delivery. In *Berenstain Bears*, girls responded slightly more often than boys in the human read version. In terms of wholistic evaluation of drawings, the CD presentation and the human read presentation had equal effects in terms of encouraging

children to express themselves in drawings. No gender differences emerged in this evaluation.

Discussion

The qualitative data showed that boys responded more often to the CD versions of stories. Yet they showed by their preferences that their story of choice was a human read story. This finding was initially puzzling. Why would boys find the CD stories more worthy of response yet choose as favorite a human read story? Could it be that the electronic story, with all of its' movement and zany antics, incites more reaction and stimulates thought while the nurturing element of the human read experience fulfills a more important need for 5 and 6 year olds? Without further study, one can only theorize as to why the children in this study responded in this way.

The statistically significant differences concerning mode of story delivery derived from the quantitative analysis appeared in only three of the eight comparisons. In *Little Monster*, the BME (Beginning/ Middle/ End) measure in Phase 1 showed upon Post Hoc testing that the CD experience yielded results that were significantly better than results derived from the human read experience upon immediate testing. Yet in Phase 2 for *Berenstain Bears*, the same measure showed upon Post Hoc testing that the human read experience with immediate post testing yielded results that were significantly better than results derived from the CD experience. These statistically significant differences appear to neutralize each other. Each story and each mode is represented as yielding statistically significant results. The only other statistically significant mode effect ($F(1,36)=3.03, p<.10$) was found

in the comparisons addressing the Idea Units measure. This significance was found--because of the small sample size--using a p value of .10. The number and strength of the statistical significances found, then, were not profound.

The evidence of few significant findings, however, is good news. In conceptualizing this study, children were observed experiencing electronic stories. These students appeared to be randomly clicking on items on the screen, having their attention from the text taken away more and more with each animated action. In piloting the story retelling instrument, when asked to retell the story after having experienced it on the computer one child responded that he didn't remember anything about the story. Because of these observations, expectations for the results of this study were that the human read story would far surpass the electronic story delivery. It was hoped that the electronic story would be even half as effective in terms of literacy learnings as the human read story. As it turns out, the CD story experience was essentially equivalent to the human read experience with regard to the literacy learnings tested by the chosen assessment instruments. With all but three of the comparisons showing no significant difference for mode of story delivery, teachers and parents can be assured that children who encounter electronic stories are indeed benefiting from the experience in terms of literacy learnings. Further, teachers can employ electronic stories as one means of exposing children to a greater number of stories thus enhancing the possibility of their success in literacy acquisition. Furthermore, the value of the

electronic books in terms of children's exposure to repeated readings cannot be ignored.

The potential for electronic stories however, has yet to be adequately explored. Storybook reading to children within our society is a behavior that is as commonplace as getting out of bed in the morning. This form of story delivery, then, is the norm. Our culture and language are rich with positive references to reading stories, in the traditional sense, from books. This expected and accepted form of story delivery would of necessity effect children's performance concerning comparisons between assessments derived from human read experiences and computer read experiences. One can only speculate as to the outcome of these same comparisons had computer generated stories been as second nature to the children in this study as human read stories.

Conclusions

It has been seen from the data collected in this study that the electronic storybook is one tool that can yield similar, if not in some cases the same, outcomes as those generated by the human read story. This is not to say that the human reader can be replaced totally by an electronic version of a story. The mediation by the adult reader in terms of discussion and expansion of the text remains a pivotal element of the read aloud experience (Anderson, 1985; Paris & Lindauer, 1976; Peters, 1993; Robbins & Ehri, 1994). Furthermore, the human contact, the physical and emotional closeness, produced by the story read by a human reader cannot be replicated by a computer. But the electronic story does provide some of the elements derived from a traditional book reading

experience. Time spent with electronic stories can give children some building blocks that will aid in their acquisition of literacy.

Electronic texts have extraordinary potential for children. The software is very well done in that the stories chosen for this media are, for the most part, stories written by well known children's authors. Further, the illustrations are copied directly into electronic format thus the beauty of the original art work remains intact. Software designers then apply animation to the stories along with the availability of all sorts of interaction with the program by the child. The stories are read using pleasing voices--sometimes childlike voices, sometimes adult voices. Words on the screen can be repeatedly accessed through a click of the mouse. The computer is a tireless storyteller. Children can see, hear and interact with a story repeatedly without the least hint of complaint from the reader.

This research suggests that stories should be read to children by someone who can be in physical, intellectual, and emotional contact with the child. When stories cannot be read to children by such a person, the electronic story experience can be just as beneficial to children in terms of some literacy learnings. Book publishers and software developers should be encouraged to publish many works concurrently. Further, electronic stories are good candidates for repeated readings and should be explored for the purpose of discovering new pedagogy concerning literacy acquisition.

Limitations

The sample size was perhaps the greatest limitation to this study. Other limitations included the fact that the study was conducted at only one school site. This study was designed to

observe children's responses to computer generated stories through a literacy lens. The full potential of computer assisted instruction was not explored. In the Drawing Recall segment of the study, children were not consistently given the same selection of colors of crayons. Further, in examining the art work from the Drawing Recall for the qualitative analysis, the outside expert was not blind to the mode of story delivery that generated the art work. This control factor was not even considered to be important by the researcher until after the analysis had been completed. Children should have been queried as to their actual choice of story delivery. Since this was not done, data from the Story Preference Tool in terms of choice of mode of delivery could only be inferred from the responses to the actual story.

Recommendations for Future Study

In terms of recommendations for future study, all of the above limitations should be addressed. Data collection for this study was conducted in the Spring of the year. It would be important to know if five and six year olds in the beginning of the school year would respond in the same or similar ways. The children in this study knew something about story structure. Would the results have been different if the children had not been prepared with this knowledge? Will children with less knowledge of story structure be as apt to gain as much from an electronic story as children with fundamental story structure knowledge? It would be advantageous to teachers to know at what point in a child's path toward literacy acquisition the electronic story can be of benefit. Also, because of the problem with story equivalency, the use of one story would be preferable.

Gender should be investigated in terms of storybook reading and emergent readers. Again because of the small sample size, it was impossible to consider gender in the quantitative design. The finding that boys preferred the human read experience slightly more often than did girls was a surprise and begs further research. With a larger sample, gender investigation could also yield interesting differences in terms of mode of story delivery.

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